

# **J.D. Jackson and the Superconducting Super Collider SSC**

From Beginning to End  
1983 - 1992



- JD had a profound impact on the SSC concept, the design and preparation for presentation to the President that ultimately led to presidential approval

- Major events in the period 1983 – 1987
  - after very stressful series of reviews, HEPAP recommends construction of the SSC to the DOE, JDJ was member of the HEPAP Subpanel recommending (SSC name proposed by JDJ)
  - DOE accepts the recommendation
  - DOE contracts with URA for R&D towards the SSC managed by a “*Central Design Group*” (CDG)
  - JDJ assumes role of *Deputy Director* (DD) of the CDG, located at LBL as host – DD takes responsibility for direction of operations 1984 - 1987
  - Magnet style down select (three to choose from)
  - The SSC Design Report written and issued under JDJ’s supervision and active participation.
  - JDJ writes or co-authors more than 15 technical notes and reports dealing with everything from superconducting cable to layered beam tubes to physics to be done with the SSC and much in between
  - After leaving the CDG, JDJ served on the SSC Program Advisory Committee 1989 – 1992

- Why was this all an extraordinary accomplishment?
  - because of unprecedented scale
  - because of many technical hurdles
  - perhaps most of all because of human hurdles (read about 'em in Genesis)

## Scale



Some comparisons to other “big” proton-proton colliders

	SSC	LHC	Tevatron
Circumference	54 mi	17	4
Beam Energy	20 TeV	7	1

## Technical Hurdles

- ✓ magnets stronger than other earlier machines (stress)
- ✓ stability in face of size and of realistic magnet errors
- ✓ cryogenics in the face of synchrotron radiation
- ✓ earth movements – tidal, microseismic ....
- ✓ .....

## Organizational

- ❖ On a constant background of inter-lab tensions, the situation was exacerbated by the need for one lab's accelerator project to die so that the SSC could be born
- ❖ The tensions were further exacerbated by the competition to select a magnet design - the designs put forward of course corresponded to the different labs involved, one actually being injected from a non DOE lab
- ❖ A first step to resolve these tensions was to recruit the design team (CDG) from the labs and universities already involved and comprising experts from the competing labs with the needed expertise

## Making it Work

Think about it.....

- All the elements for colossal failure present:
  - surfeit of bitterness among the CDG team of 50 plus
  - team members had not worked together before
- Nevertheless the Design and Cost Estimate were produced on time and were accepted with praise by all reviewers appointed by the URA and by the DOE
  - success attributable to, among other things, Dave's superior technical expertise in practical physics, his forceful personality, his absolute integrity and his ability to see the forest AND the trees and, of course, his insistence that things be right
- In addition he "took care" of the team. An important example among many others – concern for the team's intellectual health
  - he instituted a "Journal Club" to present general science separate from the current focus of team's work
  - - I remember one that he gave himself, presenting a bio of Boltzmann and his accomplishments
  - - and another in which we got a beginner's lesson on Berry's phase
  - - etc

## Finale

*J.D. Jackson played a major role in nurturing the concept of the SSC and developing the all important details to the point where it could be approved by the President of the United States.*

*This was made possible by his great intellectual power and great power of personality, both honed over long practice in the world community of science*

*He was unique and we were extraordinarily fortunate to have been his colleagues*

*Finis*